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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,539	04/14/2004	Ayako Nakano	04329.3304	4440

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EXAMINER	
ROSASCO, STEPHEN D	
ART UNIT	**PAPER NUMBER**
1795	
MAIL DATE	**DELIVERY MODE**
11/06/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/823,539	NAKANO ET AL.	
	Examiner	Art Unit	
	Stephen Rosasco	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 September 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) *13-24* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12 and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

In response to the Amendment of 9/4/07 the examiner withdraws the previous office action rejections and includes a new rejection necessitated by amendment, and makes the action Final.

Remarks – the applicant has amended the claims to include the limitations of a first and second layer which are used to determine the processing variation. The applicant has argued that the previous rejections did not address the "predetermined process variation" limitation of the claims, and fails to disclose "extracting a first pattern of a first layer" and "extracting a second pattern of one or more second layers different from the first layer," as required by amended claims 1, 10, and 25.

The reference included with this action to Magoshi et al. addresses process variations including the step of performing a predetermined geometric operation between data associated with a pattern to be transferred to said first layer and data associated with a pattern to be transferred to a second layer different from said first layer; and performing pattern correction (see col. 34, lines 8+).

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed

until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-12 and 25 are rejected under 35 U.S.C. 102(b) as being anticiapted by Magoshi et al. (6,316,163).

The claimed invention is directed to a pattern forming method of forming a desired pattern on a semiconductor substrate comprising: extracting a first pattern of a layer; extracting a second pattern of one or more layers overlapped with the layer, the second pattern being arranged close to or overlapped with the first pattern;

calculating a distance between the first and second patterns on a semiconductor substrate in consideration of a predetermined process variation; determining whether or not the distance between the first and second patterns satisfy an allowable margin given for the distance between the first and second patterns;

and correcting, if the distance does not satisfy the allowable margin, at least one of the first and second patterns to satisfy the allowable margin.

And wherein the first and second patterns comprise one of a design patternand a mask pattern formed on a mask, and the layers includes the patterns concurrently arranged each other.

And wherein the process variation includes at least one of a variation of an exposure quantity of an exposure apparatus, a variation of a focal distance, a variation of an exposure irradiation, a variation of a lens aberration, a variation of a mask dimension, a variation of a development process, and a variation of an etching process.

Magoshi et al. (see claims) discloses a method for forming patterns wherein pattern transfer to the same photosensitive material on a first layer is carried out using both light exposure and charged particle beam exposure, said method comprising the step of performing a predetermined geometric operation between data associated with a pattern to be transferred to said first layer and data associated with a pattern to be transferred to a second layer different from said first layer;

separating said pattern data associated with the pattern o be transferred to the first layer into first exposure pattern data for charged particle beam exposure and second exposure pattern data for light exposure; and

performing pattern transfer onto said first layer based on the result of said separation, wherein said geometric operation is at least either a process of extracting an overlapping area between the pattern to be transferred to said first layer and the pattern to be transferred to said second layer from the pattern to be transferred to said first layer or a process of removing the same.

And wherein the process of extracting an overlapping area between the pattern to be transferred to said first layer and the pattern to be transferred to said second layer from

the pattern to be transferred to the first layer is a process of extracting an overlapping area between a pattern obtained by oversizing the pattern to be transferred to the second layer and the pattern to be transferred to the first layer from the pattern to be transferred to the first layer.

And wherein said process of generating the first exposure pattern data includes a process of adding the pattern obtained by said extraction process and the pattern obtained by said removing process when said patterns are smaller than a first and second thresholds, respectively, and wherein said process of generating the second exposure pattern data includes a process of adding the pattern obtained by said extraction process and the pattern obtained by said removing process when said patterns are greater than a first and second thresholds, respectively.

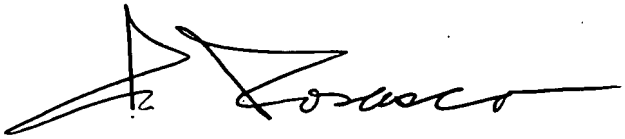
Magoshi et al. also teach (see col. 27, lines 15+) ·· Next, step P12 separates the patterns into patterns exposed by electron beams and light. For example, the method for extraction is a method wherein patterns having widths smaller than a reference pattern width are extracted as patterns exposed by electron beams. At this time, if the size of the boundary between electron beam exposure and light exposure is defined as a pattern width L of the resist pattern as described above, the boundary size L is narrowed by an amount 2.DELTA.W1 to use a value (L·2.DELTA.W1) as a reference pattern width for extracting patterns exposed by electron beams. As a result, the gate electrode pattern 35 in FIG. 20B is separated as a pattern to be exposed electron beams, and the pads 33 and 34 are separated as patterns exposed by light.

And regarding performing pattern correction (see col. 34, lines 8+) – including FIG. 26E shows the distribution of doses of incident electrons of lithographic data for fabricating photomasks using an electron-beam exposure apparatus as viewed in the section A--A. However, variation of the size occurs in data for photomask lithography generated based on this map because of back-scattered electrons that occur during electron beam pattern exposure (FIG. 26F shows the distribution of the same which is obtained during a calculation to correct the doses). Therefore, data for doses for correcting photomask pattern lithography is generated by subtracting the doses during electron beam exposure from the distribution of doses shown in this map. However, it is necessary to identify the relationship between the dose of electron beams on the resist used on the photomask substrate and the sizes thereof when photomasks are, fabricated in consideration to possibility of use of different resists and different electron reflection coefficient of substrates. FIG. 28A shows an example showing the relationship between the dose of electrons on a resist used for the fabrication of photomasks and the sizes of the resist.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Stephen Rosasco whose telephone number is (571) 272-1389. The Examiner can normally be reached Monday-Friday, from 8:00 AM to 4:30 PM. The Examiner's supervisor, Mark Huff, can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



S. Rosasco
Primary Examiner
Art Unit 1756

S.Rosasco
11/05/07